3GPP TSG-RAN WG2 Meeting #111 electronic draftR2-2008127

**Online, August 17th - 28th, 2020**

Agenda Item: 10.7

Source: Session Chair (Huawei)

Title: draft Report NB-IoT breakout session

Document for: Approval

**General**

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Please see the following Tdocs for e-meeting guidance:

R2-2006500 Agenda for RAN2#111-e Chairman agenda Late

**Time Schedule**Please refer to the latest schedule in the RAN2 inbox on the public 3GPP servers.

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<https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Inbox>

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**Organizational**

* All organizational emails and notes will be shared over the following email discussion throughout both meeting weeks:
* [AT111-e][300][NBIOT] Organisational (Session Chair)

Status: Started

Scope: Comments to session notes. Kick-off and management of email discussions for NB-IoT session. Coordination issues. Other organisational issues and announcements.

Intended outcome: Approval of Report from NB-IoT session.

Deadline: August 28 1000 UTC

**List and Status of Offline Email Discussions**

NOTE: The official kick off date for these email discussions is Monday, June 1st 0700 UTC. The rapporteurs can share them on the reflector earlier, however companies are not required to participate before the official kick off date. The deadlines refer to the deadline for providing company comments unless stated otherwise.

* [AT111-e][301][NBIOT/eMTC R15] NPRACH carrier selection (ZTE)

Status: complete

Scope: Discuss which changes, if any, are agreeable.

Intended outcome: Report in [R2-2008301](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008301.zip) and Agreeable CRs (if needed)

Deadline: Tuesday 25 1100 UTC.

* [Ext111-e][302][NBIOT/eMTC R15] WUS last used cell (Huawei)

Status: extend 1 week after meeting

Scope: Conclude on the solution and CRs.

Intended outcome: Report in R2-2008302, and agreed CRs (36.300, 36.304, and if needed 36.331)

Deadline: 1 week

* [AT111-e][303][NBIOT/eMTC R16] 36.331 miscellaneous corrections (Huawei)

Status: complete

Scope: Polish the CR.

Intended outcome: Agreeable CR in [R2-2008303](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008303.zip)

Deadline: Tuesday 25 1100 UTC.

* [AT111-e][304][NBIOT/eMTC R16] 36.300 miscellaneous corrections (Huawei)

Status: complete

Scope: Polish the CR.

Intended outcome: Agreeable CR in [R2-2008304](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008304.zip)

Deadline: Tuesday 25 1100 UTC.

* [AT111-e][305][NBIOT/eMTC R16] WUS related 36.304 corrections (Qualcomm)

Status: complete

Scope: Polish the CR.

Intended outcome: Agreeable CR in [R2-2008305](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008305.zip)

Deadline: Tuesday 25 1100 UTC.

* [Ext111-e][306][NBIOT R16] 36.304 miscellaneous corrections (Huawei)

Status: extend 1 week after meeting

Scope: resolve how/where to describe Index i\_s.

Intended outcome: Agreeable CR in [R2-2008313](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008306.zip" \o "https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008306.zip)

Deadline: 1 week.

* [Ext111-e][307][NBIOT/eMTC R16] 36.321 PUR corrections (ZTE )

Status: extend 1 week after meeting

Scope: Finalise the PUR correction CRs

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Intended outcome: Agreed MAC CR in R2-2008314, RRC CR in R2-2008315 (if needed)

Deadline: 1 week

* [AT111-e][308][NBIOT/eMTC R17] RLF enhancements (Qualcomm)

Status: complete

Scope: To clarify the scope of this objective in terms of what could be enhanced.

Intended outcome: Report in [R2-2008310](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008310.zip)

Deadline: Wednesday 26 1100 UTC.

* [AT111-e][309][NBIOT/eMTC R17] Carrier selection (Ericsson)

Status: complete

Scope: To clarify the scope of this objective in terms of what could be enhanced.

Intended outcome: Report in [R2-2008311](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008311.zip)

Deadline: Wednesday 26 1100 UTC.

## 4.1 NB-IoT corrections Rel-15 and earlier

Documents in this agenda item will be handled in a break out session. Common NB-IoT/eMTC parts treated jointly with 4.2. No web conference is planned for this agenda item

[R2-2008457](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008457.zip)         Reply LS on system support for WUS (R3-205652; contact: Qualcomm)

* Noted

R2-2008550         Reply LS on assistance indication for WUS (S2-2006499; contact: Qualcomm)

* Noted

[R2-2006838](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006838.zip) 36331\_R15\_Clarification for NPRACH carrier selection ZTE Corporation, Sanechips, MediaTek Inc CR Rel-15 36.331 15.10.0 4354 - F NB\_IOTenh2-Core

* QC wonder what happens when NW does not want mixed mode UE to use legacy list carriers, and thinks the UE would end up maintaining 2 lists for use with CFRA and CBRA. HW have the same understanding as QC on issue2, and also NW configuration can avoid most of the problems raised.
* Ericsson thinks MAC may also be impacted if we change this.
* [AT111-e][301][NBIOT/eMTC R15] NPRACH carrier selection (ZTE)

Status:

Scope: Discuss which changes, if any, are agreeable.

Intended outcome: Report in [R2-2008301](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008301.zip) and Agreeable CRs (if needed)

Deadline: Tuesday 25 1100 UTC.

[R2-2008301](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008301.zip) Report of [AT111-e][301][NBIOT R15] NPRACH carrier selection (ZTE)

* RAN2 understand that when *ul-ConfigListMixed* is present but *nprach-Distribution* is absent, only *ul-ConfigListMixed* would be used for all the cases, i.e. initial access, RACH in connected mode, PDCCH order and dedicated SR.

[R2-2006840](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006840.zip) 36331\_R16\_Clarification for NPRACH carrier selection ZTE Corporation, Sanechips, MediaTek Inc CR Rel-16 36.331 16.1.1 4356 - A NB\_IOTenh2-Core

* Not pursued

[R2-2007334](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007334.zip) Discussion of WUS last used cell Huawei, HiSilicon discussion Rel-15 NB\_IOTenh2-Core, LTE\_eMTC4-Core

Proposal 1: Signal in RRCConnectionRelease message that the connection has been rejected at the eNB.

Proposal 2: Introduce a new indication ‘ConnectionRejection’ as a non critical extension in RRCConnectionRelease message.

Proposal 3: Mandate WUS capable UEs to support the new indication ‘ConnectionRejection’.

[R2-2007566](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007566.zip) Way forward on WUS usage upon RRC connection release without S1 setup/release Qualcomm Incorporated discussion Rel-15 NB\_IOTenh2-Core

Proposal 1: Consider solution for issue 1 does not require any RAN2 specification changes.

Proposal 2: If issue 2 is a rare occurrence then RAN2 should consider solution 2 as the way forward.

Proposal 3: If issue 2 is a frequent occurrence then RAN2 should consider introducing RRC signaling to indicate WUS UE to continue the same behaviour regarding use of WUS as if the previous access had not taken place.

Discussion on above 2 papers:

* Huawei think there may be a long time before re-attempts if this problem occurs.
* QC thinks dedicated signalling may be needed if the problem is frequent.
* Ericsson wonders if UE will try again if it was not successful. HW thinks probably not.
* Ericsson thinks anyway this doesn’t happen frequently but in case it does the UE monitors the PO anyway so the consequence of not making any changes is acceptable.
* ZTE thinks SA2 have a potential solution from MME and we should make sure there are not 2 solutions. HW agree and think we may need to wait for SA2.
* Thales thinks we should correct this if the issue is relatively frequent, but should wait for SA2.
* QC thinks the question is how often the UE would end up being rejected in case UE thinks it should be using WUS while NW thinks otherwise.
* Nokia thinks if we do need a solution then RRC connection release is a clean solution.
* [AT111-e][302][NBIOT/eMTC R15] WUS last used cell (Huawei)

Status:

Scope: After SA2 reply, discuss what to do in RAN2.

Intended outcome: Report in R2-2008302, and CRs (36.300, 36.304, and if needed 36.331)

Deadline: Tuesday 25 1100 UTC.

* Will extend the offline discussion to a post meeting email discussion with the aim to converge on the solution and agree the CRs.
* Deadline for discussion: Tuesday 1 September
* Deadline for CR agreement 1 week after meeting
* [Ext111-e][302][NBIOT/eMTC R15] WUS last used cell (Huawei)

Scope: Conclude on the solution and CRs.

Intended outcome: Report in R2-2008302, and agreed CRs (36.300, 36.304, and if needed 36.331)

Deadline: 1 week.

R2-2008302 Offline [AT111-e][302][NBIOT/eMTC R15] WUS last used cell (Huawei)

[R2-2007330](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007330.zip) System support for Wake Up Signal Huawei, HiSilicon CR Rel-15 36.300 15.10.0 1264 3 F NB\_IOTenh2-Core, LTE\_eMTC4-Core [R2-2005932](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005932.zip)

[R2-2007331](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007331.zip) System support for Wake Up Signal Huawei, HiSilicon CR Rel-16 36.300 16.2.0 1265 2 F NB\_IOTenh2-Core, LTE\_eMTC4-Core [R2-2005933](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005933.zip)

[R2-2007332](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007332.zip) System support for Wake Up Signal Huawei, HiSilicon CR Rel-15 36.304 15.6.0 0795 2 F NB\_IOTenh2-Core, LTE\_eMTC4-Core [R2-2005934](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005934.zip)

[R2-2007333](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007333.zip) System support for Wake Up Signal Huawei, HiSilicon CR Rel-16 36.304 16.1.0 0796 2 F NB\_IOTenh2-Core, LTE\_eMTC4-Core [R2-2005935](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005935.zip)

## 7.3 Additional enhancements for NB-IoT

(NB\_IOTenh3-Core; leading WG: RAN1; REL-16; started: Jun 18; Completed: June 20; WID: RP-200293)

Documents in this agenda item will be handled in a break out session

Some sub-items in 7.2 and 7.3 may be treated jointly.

Email max expectation: 5-6 email threads

### 7.3.1 General and Stage 2 Corrections

Including incoming LSs etc

[R2-2006506](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006506.zip) LS on RAN1 clarification on MWUS frequency allocation (R1-2004952; contact: Ericsson) RAN1

* Taken into account already in the agreed CR from last meeting.
* Noted

[R2-2006519](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006519.zip) Reply LS on assistance indication for WUS (R3-204175; contact: Qualcomm) RAN3 LS in Rel-15 NB\_IOTenh3-Core, LTE\_eMTC5-Core To:SA2, RAN2 Cc:CT1

* Noted

[R2-2007337](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007337.zip) Miscellaneous corrections for Rel-16 NB-IoT Huawei, HiSilicon CR Rel-16 36.331 16.1.1 4380 - F NB\_IOTenh3-Core, LTE\_eMTC5-Core

* Revised in [R2-2008303](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008303.zip)
* [AT111-e][303][NBIOT/eMTC R16] 36.331 miscellaneous corrections (Huawei)

Status:

Scope: Polish the CR.

Intended outcome: Agreeable CR in [R2-2008303](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008303.zip)

Deadline: Tuesday 25 1100 UTC.

[R2-2008303](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008303.zip) Miscellaneous corrections for Rel-16 NB-IoT Huawei, HiSilicon CR Rel-16 36.331 16.1.1 4380 1 F NB\_IOTenh3-Core, LTE\_eMTC5-Core

* Update the cover page for NBC change according to chair guidance
* With the above change the CR is agreed in R2-2008312

[R2-2007338](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007338.zip) Miscellaneous corrections to NB-IoT and eMTC Rel-16 enhancements Huawei, HiSilicon CR Rel-16 36.300 16.2.0 1300 - F NB\_IOTenh3-Core, LTE\_eMTC5-Core

* Revised in [R2-2008304](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008304.zip)
* [AT111-e][304][NBIOT/eMTC R16] 36.300 miscellaneous corrections (Huawei)

Status:

Scope: Polish the CR.

Intended outcome: Agreeable CR in [R2-2008304](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008304.zip)

Deadline: Tuesday 25 1100 UTC.

[R2-2008304](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008304.zip) Miscellaneous corrections to NB-IoT and eMTC Rel-16 enhancements Huawei, HiSilicon CR Rel-16 36.300 16.2.0 1300 1 F NB\_IOTenh3-Core, LTE\_eMTC5-Core

* Agreed

### 7.3.2 UE-group wake-up signal (WUS) Corrections

UE group wake Up signal for MTC and NB-IoT is treated jointly under this Agenda Item.

[R2-2007336](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007336.zip) Corrections to GWUS Huawei, HiSilicon CR Rel-16 36.304 16.1.0 0809 - F NB\_IOTenh3-Core, LTE\_eMTC5-Core

* Merge with CR in #305

[R2-2007567](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007567.zip) Group WUS corrections Qualcomm Incorporated CR Rel-16 36.304 16.1.0 0810 - F NB\_IOTenh3-Core, LTE\_eMTC5-Core

* Revised in [R2-2008305](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008305.zip)
* [AT111-e][305][NBIOT/eMTC R16] WUS related 36.304 corrections (Qualcomm)

Status:

Scope: Polish the CR.

Intended outcome: Agreeable CR in [R2-2008305](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008305.zip)

Deadline: Tuesday 25 1100 UTC.

[R2-2008305](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008305.zip) (G)WUS corrections Qualcomm Incorporated CR Rel-16 36.304 16.1.0 0810 1 F NB\_IOTenh3-Core, LTE\_eMTC5-Core

* Agreed

[R2-2007568](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007568.zip) WUS corrections Qualcomm Incorporated CR Rel-16 36.300 16.2.0 1304 - F LTE\_eMTC5-Core

* Merge with CR in #304

### 7.3.3 Transmission in preconfigured resources corrections

Transmission in preconfigured resources for MTC and NB-IoT is treated jointly under this Agenda Item.

HARQ feedback for PUR response

[R2-2006846](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006846.zip) HARQ feedback for PUR response ZTE Corporation, Sanechips discussion NB\_IOTenh3-Core

Proposal 1: If the timeAlignmentTimer is stopped or expired and the HARQ feedback except for PDSCH addressed with PUR-RNTI is to be transmitted, MAC doesn’t indicate the HARQ feedback to the physical layer.

* Ericsson think this wouldn’t apply in PUR case, so wonder if something needs to be fixed. QC agree with Ericsson but maybe we can discuss exactly how this should be captured in MAC.
* Huawei agrees with the intention but should discuss this along with other TA issues.
* LG agree with Ericsson and QC and think MAC needs to be corrected in line with the proposal.
* [AT111-e][307][NBIOT/eMTC R16] 36.321 PUR corrections (ZTE )

Status:

Scope: To discuss MAC corrections for 36.321 based on the submitted CRs and discussion papers, include PUR-RNTI changes from rapporteur CR in common LTE session.

Intended outcome: Report in [R2-2008307](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008307.zip) and merged MAC CR in [R2-2008308](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008308.zip)

Deadline: Tuesday 25 1100 UTC.

* Legacy TA timer needs to be started/restarted in case of PUR fallback (i.e. moving to connected) but cannot start for other PUR cases

[R2-2008307](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008307.zip) Report of [AT111-e][307][NBIOT/eMTC R16] 36.321 PUR corrections (ZTE)

* noted

[R2-2007398](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007398.zip) TA validation check for HARQ feeback to PUR response LG Electronics UK discussion Rel-16

[R2-2007739](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007739.zip) HARQ feedback in RRC\_IDLE ASUSTeK discussion Rel-16 36.321 NB\_IOTenh3-Core

Others

[R2-2006842](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006842.zip) Starting legacy TA timer for PUR fallback ZTE Corporation, Sanechips discussion NB\_IOTenh3-Core

* included in #307

[R2-2007339](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007339.zip) Discussion on carrier configuration for PUR Huawei, HiSilicon discussion Rel-16 NB\_IOTenh3-Core

* ZTE, QC prefer option 3 (NBC change).
* Will correct according to option 3
* Correct as part of #303

[R2-2007738](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007738.zip) Impact on D-PUR TA timer due to reconfiguration of PUR periodicity and offset ASUSTeK discussion Rel-16 NB\_IOTenh3-Core

* Included in #307

36.300

[R2-2007901](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007901.zip) CR for starting legacy TA timer for PUR fallback ZTE Corporation, Sanechips CR Rel-16 36.300 16.2.0 1310 - F NB\_IOTenh3-Core

* Can revisit if necessary based on offline #307

[R2-2006980](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006980.zip) Addition of PUR RNTI in E-UTRA related UE identities Qualcomm Inc CR Rel-16 36.300 16.2.0 1297 - F LTE\_eMTC5-Core, NB\_IOTenh3-Core

* Agreed

36.321

[R2-2006848](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006848.zip) Correction on discarding PUR-RNTI ZTE Corporation, Sanechips CR Rel-16 36.321 16.1.0 1489 - F NB\_IOTenh3-Core

* Included in #307

[R2-2007365](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007365.zip) Correction to discard of PUR-RNTI Ericsson CR Rel-16 36.321 16.1.0 1494 - F LTE\_eMTC5-Core, NB\_IOTenh3-Core

* Included in #307

[R2-2007987](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007987.zip) CR for HARQ feedback for PUR response ZTE Corporation, Sanechips CR Rel-16 36.321 16.1.0 1503 - F NB\_IOTenh3-Core

* Included in #307
* Revised in [R2-2008308](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008308.zip)

[R2-2008308](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008308.zip) MAC corrections for PUR ZTE Corporation, Sanechips CR Rel-16 36.321 16.1.0 1503 1 F NB\_IOTenh3-Core

* Revised in R2-2008314

R2-2008314 MAC corrections for PUR ZTE Corporation, Sanechips CR Rel-16 36.321 16.1.0 1503 2 F NB\_IOTenh3-Core

* [Ext111-e][307][NBIOT/eMTC R16] PUR corrections (ZTE)

Scope: Finalise the PUR correction CRs

Intended outcome: Agreed MAC CR in R2-2008314, RRC CR in R2-2008315 (if needed)

Deadline: 1 week

[R2-2006849](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006849.zip) Other corrections on 36321 for PUR ZTE Corporation, Sanechips CR Rel-16 36.321 16.1.0 1490 - F NB\_IOTenh3-Core

* Included in #307

### 7.3.4 Other NB-IoT Specific corrections

NB-IoT specific topics

[R2-2006851](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006851.zip) Minor corrections on 36304 for NB-IoT ZTE Corporation, Sanechips CR Rel-16 36.304 16.1.0 0804 - F NB\_IOTenh3-Core

* Merge WUS related changes with #305, and other with #306

[R2-2007335](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007335.zip) Correction to NB-IoT supported functionality in idle mode Huawei, HiSilicon CR Rel-16 36.304 16.1.0 0808 - F NB\_IOTenh3-Core

* Revised in [R2-2008306](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008306.zip)
* [AT111-e][306][NBIOT R16] 36.304 miscellaneous corrections (Huawei)

Status:

Scope: Polish the CR.

Intended outcome: Agreeable CR in [R2-2008306](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008306.zip)

Deadline: Tuesday 25 1100 UTC.

[R2-2008306](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008306.zip) Miscellaneous corrections to NB-IoT Rel-16 enhancements Huawei, HiSilicon CR Rel-16 36.304 16.1.0 0808 1 F NB\_IOTenh3-Core

* Qualcomm thinks the Index i\_s should move under the second calculations
* Revised in R2-2008313
* Extend [306] 1 week email after the meeting to resolve how/where to describe Index i\_s
* [Ext111-e][306][NBIOT R16] 36.304 miscellaneous corrections (Huawei)

Scope: resolve how/where to describe Index i\_s.

Intended outcome: Agreeable CR in [R2-2008313](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008306.zip" \o "https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008306.zip)

Deadline: 1 week.

### 7.3.5 NB-IoT UE capabilities corrections

## 9.1 NB-IoT and eMTC enhancements

(NB\_IOTenh4\_LTE\_eMTC6-Core; leading WG: RAN1; REL-17; WID: RP-201306)

Time budget: 1 TU

Tdoc Limitation: 2 tdocs

Email max expectation: 2 threads

Focus on two objectives only, initial discussions to understand the context, scope, potential solution proposals.

### 9.1.1 Organizational

[R2-2007696](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007696.zip) Work plan of Rel-17 enhancements for NB-IoT and LTE-MTC Ericsson, Huawei Work Plan NB\_IOTenh4\_LTE\_eMTC6-Core

* Will maintain a document similar to the one used in R16 for capturing agreements.
* [Post111-e][xxx][NBIOT/eMTC R17] Capture the agreements (Ericsson)

Scope: Capture the agreements.

Intended outcome: endorsed report in R2-2008309

Deadline: 1 week

### 9.1.2 NB-IoT neighbor cell measurements and corresponding measurement triggering before RLF

[R2-2006833](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006833.zip) Reducing time taken for reestablishment procedures in NB-IOT Ericsson discussion Rel-17

Proposal 1 RAN2 to discuss the objective of the WI; particularly as what is expected in terms of signalling.

Proposal 2 RAN2 to study and discuss which of the reestablishment procedure require solution that reduces the time taken for all three scenarios listed above.

Proposal 3 RAN2 to discuss whether and which modification of the legacy procedure of reestablishment might be required.

* QC thinks the main objective is how to do measurements in RRC\_CONNECTED and much of the impact depends on how this would be done. ZTE has a similar view, and think P2, 3 are more related to RAN3.
* Nokia thinks we should first study the delay in each stage of the re-establishment and decide what to do according to this. Nokia thinks the re-establishment procedure itself may not need to be changed. QC thinks the WID does not mention to study re-establishment procedure but it is rather already quite specific. Huawei thinks we should try to look at all aspects of the re-establishment procedure, not only measurement.
* Thales thinks we need to consider impact to devices which don’t need the enhancements, as this could be done without specification impact. Ericsson would like to understand the concerns a bit more.
* noted

[R2-2006834](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006834.zip) Cell measurement in connected mode for NB-IoT ZTE Corporation, Sanechips discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

Proposal 1: It’s suggested to support neighbor cell measurement in connected mode for NB-IoT.

Proposal 2: RAN2 discuss whether a new condition for triggering measurements in connected mode is needed.

Proposal 2a: If proposal 2 is agreed, RAN2 discuss what’s the evaluation object in this new condition, e.g., RSRP/ RSRQ level of the serving cell or the data transmission quality of the serving cell.

Proposal 2b: If proposal 2 is agreed, Intra-frequency measurement and inter-frequency measurement can be triggered independently.

Proposal 3: RAN2 can later discuss the conditions for stopping the measurement in connected mode, e.g., based on the agreements of measurement configuration by RAN2 and RAN4.

Proposal 4: RAN2 discuss whether the UE needs to notify the network of the start and stop time point of measurements in connected mode.

Proposal 5: RAN2 discuss what need to be included in the measurement configuration and how to provide it.

Proposal 6: RAN2 discuss whether neighbor cell measurements can be performed during connected mode DRX, or PDCCH monitoring GAP. If yes, how?

Proposal 7: RAN2 discuss whether a time interval for distributing measurements in connected mode is needed.

* Ericsson wonders what the RAN4 impact would be considering measurement gaps are not in the WID scope. ZTE thinks RAN4 requirements may be impacted to support connected mode measurements. Thales concern is more related to when measurements are started and stopped. Ericsson think the existing measurement framework in RAN4 could be used. Huawei are considering what the measurement impact may be and should not exclude something now, but expect something like idle mode requirements.
* QC wonder what the configuration in p5 would include. ZTE think it may include what objects for UE to measure could be included. Nokia think this may include assistance information but not necessarily measurement control.
* noted

[R2-2007342](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007342.zip) Discussion on RLF enhancements Huawei, HiSilicon discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

**Proposal 1:** RAN2 to target the mobility enhancements to mobile UEs and avoid impact on stationary UEs.

**Proposal 2:** RRC connection re-establishment procedure is reused as the mobility procedure.

**Proposal 3:** RAN2 to discuss following issues on connected mode mobility:

How neighbour cell measurement is triggered

How to perform neighbour cell measurements in RRC\_CONNECTED

How RLF is triggered

Signaling to enable the above

* QC thinks the first proposal might create a lot of discussion about how to define stationary. Ericsson wonder if this means re-establishment in the same cell is not considered. Huawei were thinking that for example the trigger for measurements may be based on similar criteria as relaxed monitoring, but the proposal is more directed at the use-case.
* ZTE think the RLF criteria can be studied and wonder whether earlier trigger is useful. Huawei think we should consider this due to measurement limitations.
* Thales thinks the stationary device is one example of a use-case where this is not needed, others include e.g. delay tolerant and very short sessions and we should avoid impacting those cases.
* Ericsson thinks from the discussion so far it sounds like most companies are thinking of some kind of measurement assistance information to speed up the overall RLF procedure by reducing cell search time, other enhancements seem to be out of scope.
* noted
* [AT111-e][308][NBIOT/eMTC R17] RLF enhancements (Qualcomm)

Status:

Scope: To clarify the scope of this objective in terms of what could be enhanced.

Intended outcome: Report in [R2-2008310](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008310.zip)

Deadline: Wednesday 26 1100 UTC.

[R2-2008310](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008310.zip) Report of [AT111-e][308][NBIOT/eMTC R17] RLF enhancements Qualcomm

* Thales want to be sure that any enhancements don’t impact UEs not supporting these. Sequans agrees. QC think in general we make features optional but can discuss after we define the solutions. Ericsson agrees.
* Nokia wonder whether there needs to be NW impact. Sequans thinks WI doesn’t require it. Ericsson think there may be an advantage from NW knowing this RLF has occurred. Nokia are thinking more about the NW control/configuration, this could also be autonomous and in this case there might be a need for reporting. Thales thinks measurements could be autonomous. Qualcomm think that measurements themselves should not be reported but that doesn’t preclude other information to be reported.
* Mediatek think that if p10 relates to how the measurement is triggered then most companies would agree.
* Lenovo think some measurement reporting could be useful.

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| Agreements:   * Study current RLF procedure to understand the time taken to select the cell for access. Start and end points FFS. * Support neighbour cell measurements in RRC\_CONNECTED, at least for intra-frequency.   + - FFS inter-frequency     - FFS whether measurements are done on the anchor carrier     - FFS how neighbour cell measurement is triggered     - FFS how to perform neighbour cell measurements * Working assumption: Neighbour cell measurement results are not reported to the network in RRC\_CONNECTED.   + - FFS whether and when other information can be sent |

* [Post111-e][xxx][NBIOT R17] RLF Enhancements (Qualcomm)

Scope: Study current RLF procedure to understand the time taken to select the cell for access. Start and end points FFS.

Intended outcome: report to next meeting

Deadline: next meeting

[R2-2007472](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007472.zip) Neighbor cell measurements triggering before RLF Lenovo, Motorola Mobility discussion Rel-17

[R2-2007569](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007569.zip) Connected mode neighbor cell measurement in NB-IoT Qualcomm Incorporated discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

[R2-2007619](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007619.zip) Clarification on Agenda Item – 9.1.2 THALES discussion Rel-17

[R2-2007951](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007951.zip) Measurement before radio link failure Shanghai Chen Si Electronics discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

[R2-2008097](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008097.zip) Analysis on Re-establishment time reduction Nokia, Nokia Shanghai Bell discussion NB\_IOTenh4\_LTE\_eMTC6-Core Late

### 9.1.3 NB-IoT carrier selection based on the coverage level, and associated carrier specific configuration

[R2-2006832](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006832.zip) NB-IoT carrier selection and configuration based on coverage level Ericsson discussion Rel-17

[R2-2006835](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006835.zip) Enhancements on multi carrier configuration and selection ZTE Corporation, Sanechips discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

[R2-2007343](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007343.zip) Use cases and scenarios of carrier specific configuration Huawei, HiSilicon discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

[R2-2007354](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007354.zip) Analysis on carrier selection options Nokia, Nokia Shanghai Bell discussion Rel-17

[R2-2007570](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007570.zip) Support for NB-IoT carrier selection based on the coverage level Qualcomm Incorporated discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

Proposal 1: Coverage based paging only supported on non-anchor carriers

Proposal 2: Consider introducing paging channel specific DRX cycle.

Proposal 3: With paging carrier selection based on coverage level, avoid mechanism that require UE to report coverage level when coverage level changes.

Proposal 4: powerClass14dBm-Offset is not applied when determining coverage level for coverage level specific paging carrier selection.

Proposal 5: From RAN2 point of view, it is beneficial to support paging narrowband selection based on coverage level for eMTC.

* Ericsson think the WID is not specific about paging so would like to understand the solutions before agreeing what to enhance.
* Huawei think p5 is not in the WI scope.
* Thales wonder how additional delays can be avoided if CE level based paging carrier selection is introduced without an indication to the NW. ZTE thinks avoiding paging failure is more important than UE power so NW may need to know explicitly which carrier is selected. QC think there are use-cases whereby coverage doesn’t change often.
* Nokia wonder if p2 means carrier specific DRX cycle, and agree that UE reporting coverage change should be avoided. QC agree p2 is about carrier, if a carrier is dedicated for a particular coverage then it can have an associated DRX cycle.
* noted

[R2-2007957](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007957.zip) Carrier selection enhancement Shanghai Chen Si Electronics discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

Proposal 1: UEs with shorter DRX cycle configuration (i.e., the DRX value below a certain threshold, like 1.28s) are allowed to select a particular non-anchor carrier for paging.

Proposal 2: A UE capability of selecting a particular non-anchor carrier for paging should be defined.

Proposal 3: Early implementation of this solution in Rel-16.

Propose 4: A part of non-anchor carriers for random access can only be selected by the UEs in good coverage for UE initiated random access.

Propose 5: No need a UE capability of selecting the non-anchor carrier based on the coverage level.

Propose 6: UE should select another carrier from the other part of the carries if it failed to access the network on the carrier for good coverage.

* Ericsson think any solution should be simple and avoid paging escalation, and are not clear what the real need for anything is. QC thinks this discussion has already happened in RAN.
* Qualcomm thinks early implementation depends on what the solution is and may not be possible if there is impact in other WGs. QC also thinks p4 is about RA carrier selection but the WID objective is about paging carrier selection. Huawei thinks there is one example in the WID implying uplink, but also think there may be no need for enhancing PRACH selection anyway.
* Nokia think selection based on UL repetitions is in the scope.
* noted
* [AT111-e][309][NBIOT/eMTC R17] Carrier selection (Ericsson)

Status:

Scope: To clarify the scope of this objective in terms of what could be enhanced.

Intended outcome: Report in [R2-2008311](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008311.zip)

Deadline: Wednesday 26 1100 UTC.

[R2-2008311](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008311.zip) [AT111-e][309][NBIOT/eMTC R17] Carrier selection (Ericsson) Ericsson

* QC thinks the enhancements could also be applicable to eMTC. Sequans, Ericsson agree.

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| Agreements   * Paging carrier selection Improvements based on CE level is considered * Paging carrier selection Improvements based on DRX cycle may be considered   + whether DRX cycle is considered as part of CE level (Rmax) or can be also considered separately * Enhancements for NPRACH Carrier selection carrier may be considered * Paging carrier selection Improvements solely based on WUS or GWUS is not considered * FFS service based |